

**FROM LIGNOCELLULOSIC
BIOMASS TO DROP-IN FUELS
VIA LIGNIN OIL UPGRADING: A
H₂ SELF-SUFFICIENT PATHWAY**

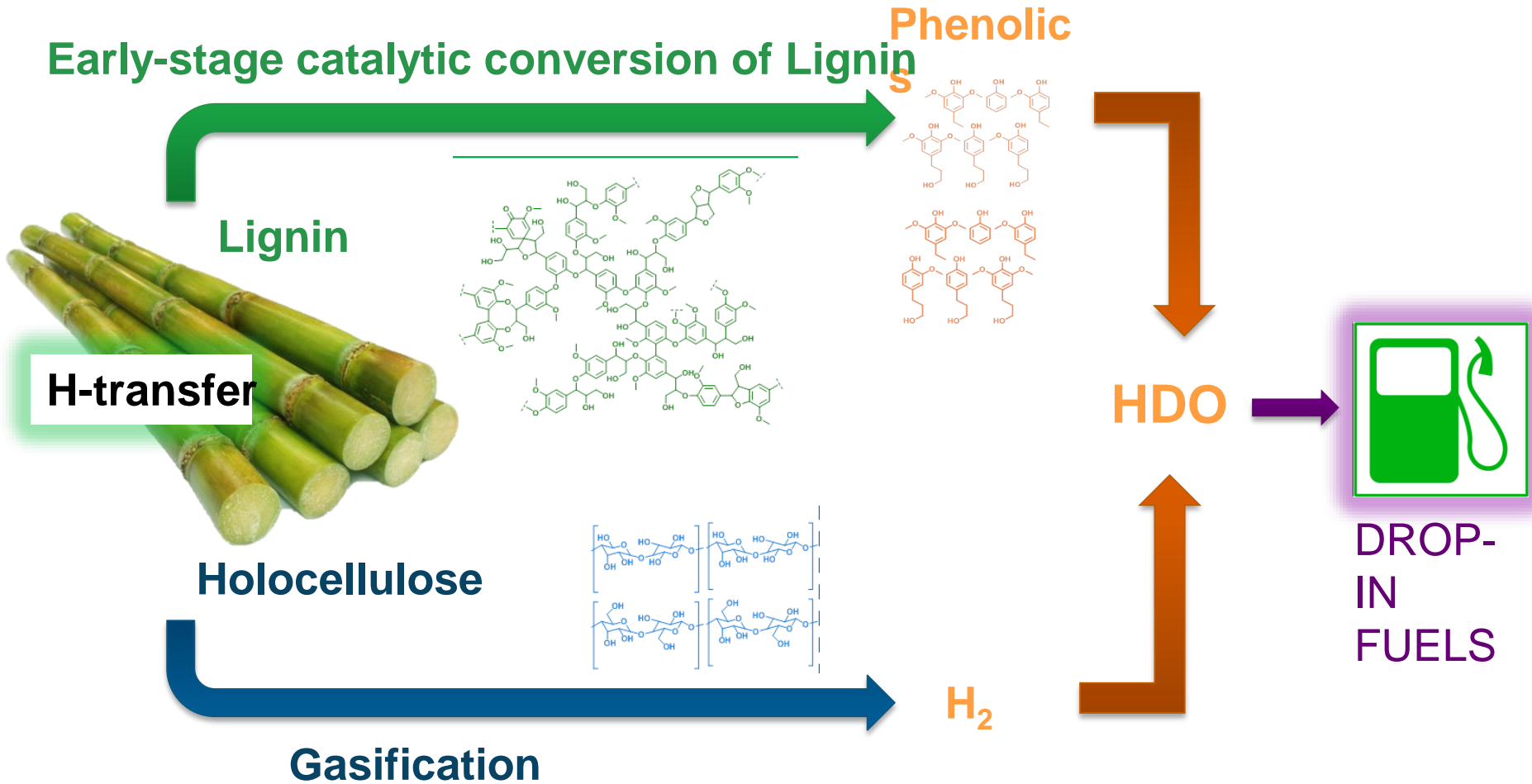
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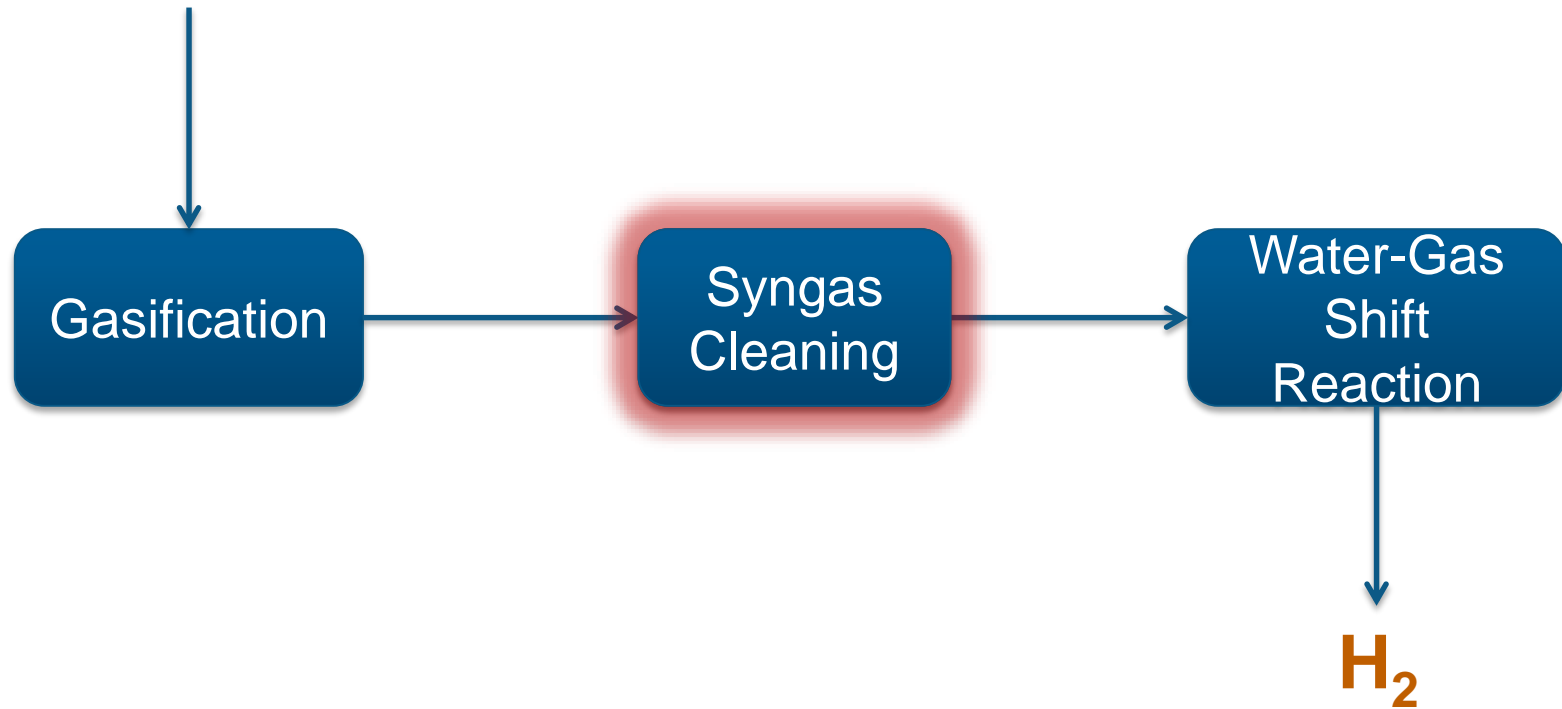
THE THREE STEP APPROACH

Early-stage catalytic conversion of Lignin



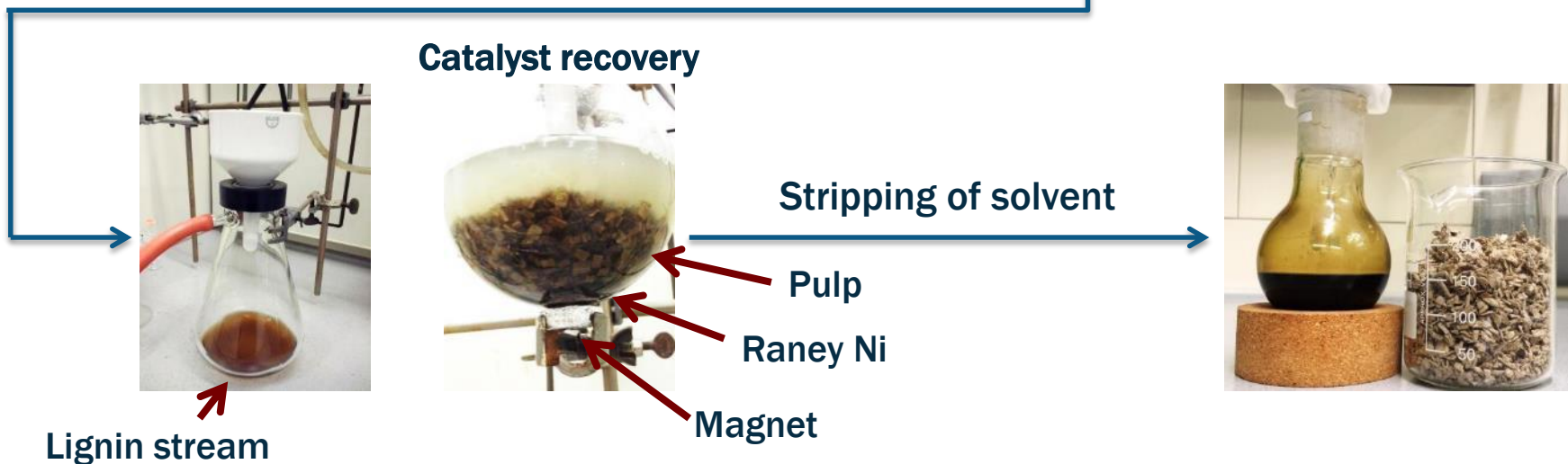
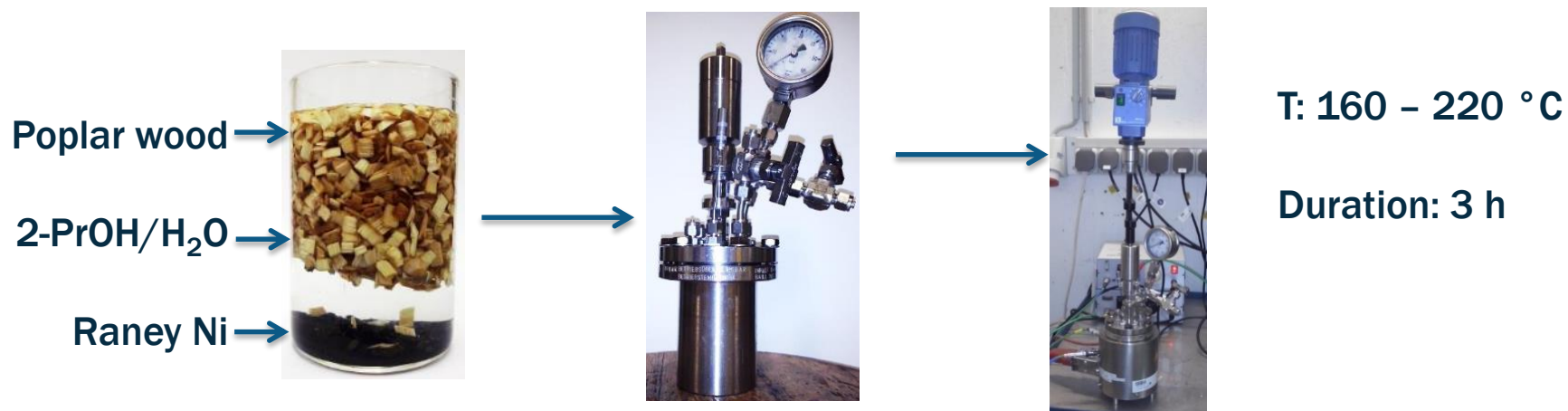
BIOMASS GASIFICATION

Holocellulose



CERQUEIRA, H. S. ; **SOUSA-AGUIAR, E. F.** . X-to-Liquids-Take your pick:
X = gas, coal, biomass. Energy Tribune, Estados Unidos, p. 14 - 15, 15 out.
2006.

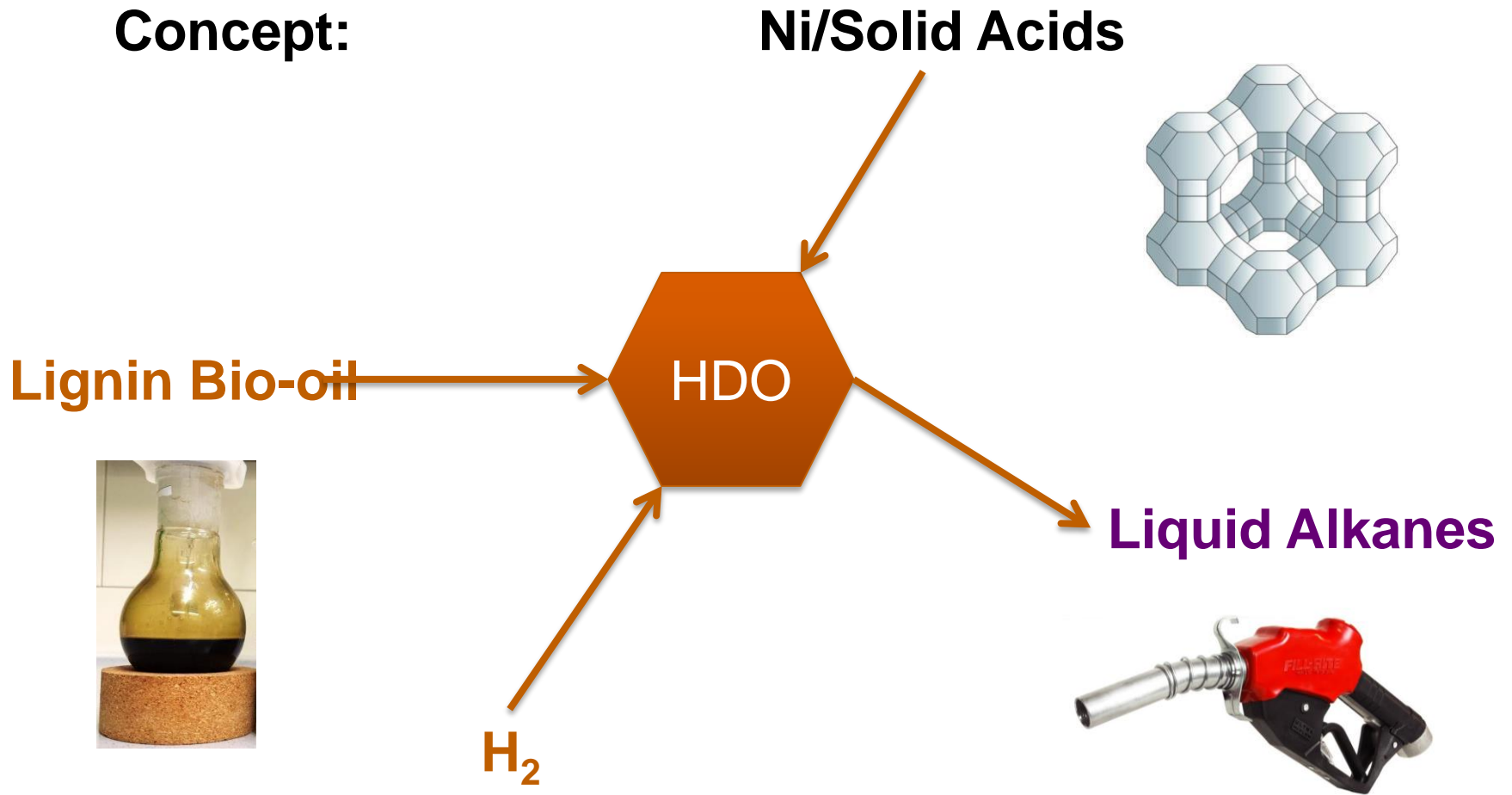
H-TRANSFER



P. Ferrini, R. Rinaldi, *Angew. Chem. Int. Ed.*, **2014**, *53*, 8634-8639

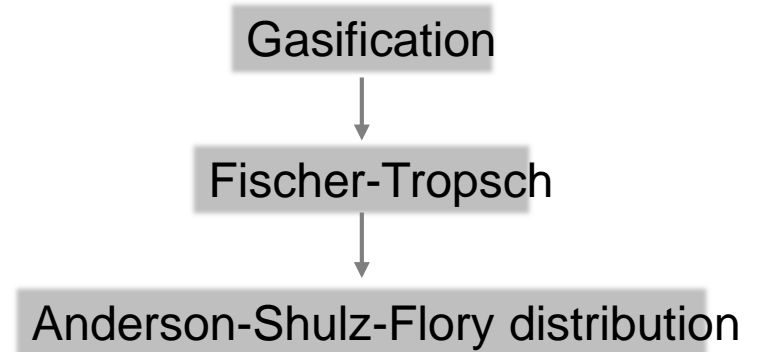
HYDRODEOXIGENATION (HDO)

Concept:

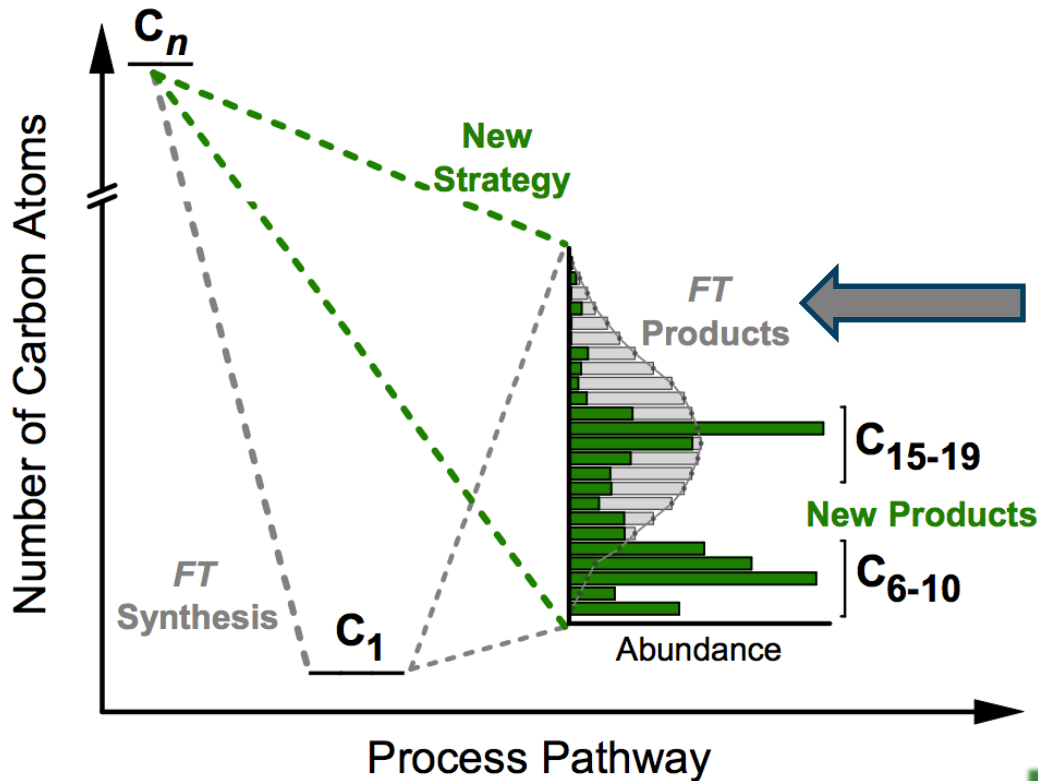
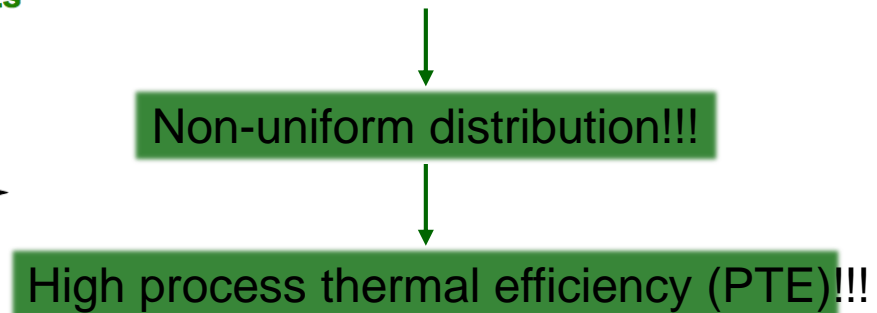


ADVANTAGES

➤ “Traditional” gasification approach



➤ **Novel “three step approach”:**



CHALLENGES

- Feedstock: Sugar cane is a low lignin content biomass (20%), which is good for the H₂ generation via holocellulose gasification but also implies lower yields in hydrocarbon.
- H-transfer: Find greener molecule for using as H-donor.
 - (IPA is mainly synthesized by propene hydration)
- HDO: Development of a more stable and active catalyst.

CONCLUSIONS:

- A novel strategy for the production of gasoline and diesel range biofuels from lignocellulosic biomass is shown;
- Self-sufficient process. No external input of expensive H₂ gas is necessary;
- Highly efficient and integrated process.

ODA AL MAR

...Todo lo arreglaremos poco a poco: te obligaremos, mar, te obligaremos, tierra, a hacer milagros, porque en nosotros mismos, en la lucha, está el pez, está el pan, está el milagro.

Pablo Neruda